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Notice of Allowability	Application No.		Applicant(s)	
	10/644,561		PAO ET AL.	
	Examiner		Art Unit	
	Naheed Ejaz		2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 12 December 2007.
2. ☒ The allowed claim(s) is/are 1-12.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|--|---|
| <ol style="list-style-type: none"> 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) 3. <input type="checkbox"/> Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date _____ 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | <ol style="list-style-type: none"> 5. <input type="checkbox"/> Notice of Informal Patent Application 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____ 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance 9. <input type="checkbox"/> Other _____ |
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DETAILED ACTION

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. John P. Wooldridge (Registration No. 38,725) on January 31, 2008.

2. The Application has been amended as follows:

In the claims:

- Claim 1, "I_n" (page 7, line 10) has been changed to ---I_N---
- Claim 1, "A_{AN}" (page 7, line 16) has been changed to ----A_{IQN}----
- Claim 1, "AN" (page 7, line 16) has been changed to ---IQN---
- Claim 2, "I_n" (page 8, line 10) has been changed to ---I_N---
- Claim 2, "A_{AN}" (page 8, line 16) has been changed to ----A_{IQN}----
- Claim 2, "AN" (page 8, line 16) has been changed to ---IQN---
- Claim 4, "I_n" (page 10, line 5) has been changed to ---I_N---
- Claim 4, "A_{AN}" (page 10, line 11) has been changed to ----A_{IQN}----
- Claim 4, "AN" (page 10, line 11) has been changed to ---IQN---
- Claim 6, "I_n" (page 11, line 5) has been changed to ---I_N---
- Claim 6, "A_{AN}" (page 12, line 1) has been changed to ----A_{IQN}----
- Claim 6, "AN" (page 12, line 1) has been changed to ---IQN---

- Claim 7, "I_n" (page 12, line 8) has been changed to ---I_N---
- Claim 7, "A_{AN}" (page 12, line 12) has been changed to ----A_{IQN}---
- Claim 7, "AN" (page 13, line 1) has been changed to ---IQN---
- Claim 8, "I_n" (page 13, line 9) has been changed to ---I_N---
- Claim 8, "A_{AN}" (page 14, line 3) has been changed to ----A_{IQN}---
- Claim 8, "AN" (page 14, line 3) has been changed to ---IQN---
- Claim 10, "I_n" (page 15, line 5) has been changed to ---I_N---
- Claim 10, "A_{AN}" (page 15, line 10) has been changed to ----A_{IQN}---
- Claim 10, "AN" (page 15, line 10) has been changed to ---IQN---
- Claim 12, "I_n" (page 16, line 5) has been changed to ---I_N---
- Claim 12, "A_{AN}" (page 16, line 10) has been changed to ----A_{IQN}---
- Claim 12, "AN" (page 16, line 10) has been changed to ---IQN---

Reasons for Allowance

3. Claims 1-12 are allowed.
4. The following is an examiner's statement of reasons for allowance:
5. With respect to claim 1, the prior art of record fails to teach or suggest a digital intermediate frequency Quadrature Amplitude modulation modulator using parallel processing without the use of a multiplier; comprising: a plurality of look-up tables (LUTs) operatively connected to receive and store said I and Q locations, wherein the I LUTs are configured I₁ to I_N, wherein N is the highest number of I LUTs of said plurality of LUTs, wherein the Q LUTs are configured Q₁ to Q_X, wherein X is the highest number of Q LUTs of said plurality of LUTs; a plurality of adders operatively connected to

receive and add said I and Q locations stored within said plurality of LUTs, wherein said plurality of adders are configured A_1 to A_{AN} , wherein IQN is the highest number of adders of said plurality of adders, wherein each I and Q having a particular subscript are added in the adder having the same subscript to produce output data comprising IQ_1 to IQ_{IQN} ; a plurality of registers operatively connected to collect and store said output data comprising IQ_1 to IQ_{IQN} ; and a digital to analog converter operatively connected to convert said output data comprising IQ_1 to IQ_{IQN} to analog data, wherein said Quadrature Amplitude Modulation modulator does not include a multiplier as recited in an independent claim 1 and in combination with other elements of the claim.

6. With respect to claims 2 & 3, the prior art of record fails to teach or suggest a digital intermediate frequency Quadrature Amplitude modulation modulator using parallel processing without the use of a multiplier, comprising: a plurality of look-up tables (LUTs) operatively connected to receive and store said I and Q locations, wherein the I LUTs are configured I_1 to I_N , wherein N is the highest number of I LUTs of said plurality of LUTs, wherein the Q LUTs are configured Q_1 to Q_X , wherein X is the highest number of Q LUTs of said plurality of LUTs; a plurality of adders operatively connected to receive and add said I and Q locations stored within said plurality of LUTs, wherein said plurality of adders are configured A_1 to A_{AN} , wherein IQN is the highest number of adders of said plurality of adders, wherein each I and Q having a particular subscript are added in the adder having the same subscript to produce output data comprising IQ_1 to IQ_{IQN} ; at least one multiplexer operatively connected to collect from said plurality of registers the subscript output data comprising only odd subscript output

data from said output data comprising IQ_1 to IQ_{IQN} ; at least one multiplexer operatively connected to collect from said plurality of registers the subscript output data comprising only even subscript output data from said output data comprising IQ_1 to IQ_{IQN} ; and a digital to analog converter operatively connected to convert said odd subscript data and said even subscript data to analog data, wherein said Quadrature Amplitude Modulation modulator does not include a multiplier as recited in an independent claim 2 and in combination with other elements of the claim.

7. Claims 4-5, 8-9 & 10-11 are allowed for the same reasons given above in the claims 2 & 3 allowances.

8. Claims 6-7 & 12 are allowed for the same reason given above in the claim 1 allowance.

9. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Wu et al. (US 6,628,727 B1) teach apparatus and method for performing $\pi/4$ -DQPSK baseband modulation based on a signal mapping to be simplified.

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Contact Information

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Naheed Ejaz whose telephone number is 571-272-5947. The examiner can normally be reached on Monday - Friday 8:00 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on 571-272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Naheed Ejaz
Examiner
Art Unit 2611

2/1/2008

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CHIEH M. FAN
SUPERVISORY PATENT EXAMINER